

# **Assessment of Aquatic Habitats on the Matador Ranch Phillips Co., MT**

**Prepared for Linda Poole, The Nature Conservancy  
by**

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**Beaver Creek Landscape from the Buffalo Jump Overlook**



**Natural Resource Information System  
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## Matador Ranch Aquatics Assessment

Project goals of the MTNHP Aquatic Surveys of the Matador Ranch were to: 1) survey and analyze macroinvertebrate and/or fish samples collected from a variety of aquatic habitats on the TNC Matador Ranch (Table 1) to assess species distributions and habitat conditions. This report represents local reach-scale, macroinvertebrate assessments that included limited fish surveys from 2005 and 2007.

### Sites

**Table 1.** Matador Ranch aquatic sites. Sites with an asterisk (\*) were also visited in 2005.

Matador Ranch Aquatic Sites	Lat	Long	Date	Time	Elevation
Little Warm Creek Site #1*	47.98961	-108.314674	6/21/2007	9:03	2923
Little Warm Creek "cattail pools"*	47.98535	-108.322773	6/21/2007	12:34	2928
Big Warm Creek*	48.03803	-108.32982	6/21/2007	10:35	2880
Matador Perennial Pond	48.00629	-108.327329	6/21/2007	11:49	2949
Fairy Shrimp Ditch Pool	48.00589	-108.325053	6/21/2007	12:10	2941
TNC Corner Spring1	47.89846	-108.202188	6/21/2007	14:03	2711
TNC Corner Spring2	47.89803	-108.202394	6/21/2007	14:28	2714
Lone Tree Coulee Pool	47.93705	-108.238239	6/21/2007	15:16	2857
Buffalo Jump Spring	47.90967	-108.266813	6/21/2007	16:21	2860
Beaver Creek Pools	47.90934	-108.265728	6/21/2007	16:40	2855

### Methods

Macroinvertebrate samples, mussel and fish data were collected at 2 Little Warm Creek sites: the county road bridge site in 2005 & 2007, hereafter, Little Warm Creek Site #1, and an upper cattail pool area, Little Warm Creek Site #2, a Big Warm Creek site at the hay field bridge site in 2005 & 2007. Macroinvertebrate samples only were collected from a roadside ditch (Fairy Shrimp Ditch), a perennial wetland pond, Beaver Creek pools and 4 springs--2 springs called TNC Corner Springs, Buffalo Jump Spring, and a Lone Tree Pool that appeared perennial and spring-fed on June 21, 2007. Macroinvertebrate samples and fish sites from 2005 were sampled 30 July.

#### *Macroinvertebrate Communities*

Macroinvertebrates were collected using the DEQ traveling kick or multi-habitat method (if no riffles are present) with a 500 micron mesh D-frame dip-net (MT DEQ 2005). Samples were preserved in 95% ETOH and delivered to MTNHP in Helena. Sample processing and bioassessment metrics were performed by David Stagliano at the MTNHP lab in Helena following MT Department of Environmental Quality standardized protocols (MT DEQ 2005). Macroinvertebrates were identified to the lowest taxonomic level, imported into EDAS (Jessup 2006), and biological metrics were calculated from the data using the MT DEQ's multimetric macroinvertebrate (MMI) protocols (Jessup et al. 2005, Feldman 2006). Metric results were then scored using the Montana DEQ bioassessment criteria and each sample categorized as non-impaired or impaired according to threshold values (Table 2).

**Table 2.** Impairment determinations from the MMI and O/E (RIVPACS) models (taken from Jessup 2005, Feldman 2006).

Ecoregion	RIVPACS	MMI	Impairment Determination
Mountain	$\geq 0.8$ or $\leq 1.2$	$\geq 63$	Not impaired
	$< 0.8$ or $> 1.2$	$< 63$	Impaired
Low Valley	$\geq 0.8$ or $\leq 1.2$	$\geq 48$	Not impaired
	$< 0.8$ or $> 1.2$	$< 48$	Impaired
Eastern Plains	$\geq 0.8$ or $\leq 1.2$	$\geq 37$	Not impaired
	$< 0.8$ or $> 1.2$	$< 37$	Impaired

### ***Fish Communities.***

Fish sampling in Little Warm Creek sites in 2005 was performed by seining pool areas from the upstream to the downstream direction with a 20 ft ¼ inch straight seine (see Pictures of Brian Martin and I). In 2005, Big Warm Creek was sampled by securing the seine in the substrate and “kicking” fish downstream into the seine to be then lifted up at both ends. In 2007, I used a Smith Root Battery Operated Electroshocker for fish collections, proceeding in an upstream direction and netting fish along the way. Fish were transferred to holding buckets, identified to species, enumerated in the field, examined for external anomalies (e.g. deformities, eroded fins, lesions, and tumors), and then released. Vouchers of the northern redbelly dace from the Little Warm Creek Site were submitted to the Montana State University fish collection in 2005.

Analysis of the sampled fish communities used derived Observed/Expected (O/E) Fish Models (Stagliano 2005) to detect impairment at the sites by measuring biological integrity of expected fish species for that stream type. We did not propose threshold criteria for good, fair, and poor biological integrity for these fish scores. Therefore, we applied commonly used criteria. Scores of 75 to 100 indicate good to excellent biological integrity, 50-74 fair to good biological integrity, 25 to 49 indicated poor to fair biological integrity and scores <25% indicate poor biological integrity or severely impaired.

***Mussels.*** Freshwater mussels were observed with a glass-bottomed bucket searching in an upstream direction prior to the fish and macroinvertebrate surveys and recorded in 2005 and 2007.

***Dragonflies and Damselflies.*** Incidental dragonfly and damselfly observations were made and recorded during the fish and macroinvertebrate surveys in 2005 and 2007.

***Amphibian and Reptile Incidentals.*** Incidental herpetofauna observations were made and recorded in conjunction with the fish and macroinvertebrate surveys.

## Results

**Three Lotic & 2 Lentic Aquatic Ecological Systems were classified on the Matador Ranch:**

### **Lotic AES (Stagliano 2005)**

**Northern Glaciated Perennial Prairie Stream** (AES C006)-1) Big Warm & Little Warm Creek

**Northern Glaciated Intermittent Prairie Stream**-(AES D006)- 1) Beaver Creek

**Northwestern Great Plains Perennial Spring/Seep** (AES S005)-1) TNC Corner Springs, 2) Buffalo Jump Spring, 3) Lone Tree Pool Spring

### **Lentic AES**

**Northern Glaciated Perennial Prairie Pothole/Pond**-(AES code L006)- 1) Matador Ranch Perennial Pond

**Northern Glaciated Intermittent Prairie Pools**-(AES code E006)- 1) Fairy Shrimp Ditch

**Macroinvertebrate Communities:** Overall, ~80 macroinvertebrate taxa were reported so far from the analyzed samples from the Matador Ranch sites (4 sites have not been evaluated or identified yet) (Appendix A). Four distinct aquatic invertebrate species groups (SPA's) exist on the ranch: the Riverine SPA, the Lentic (Wetland/Pond) SPA, the Perennial Spring SPA, and the Intermittent Prairie Pool SPA. Some sites have combinations of multiple SPA groups. For example Big Warm Creek has unique riverine invertebrate taxa (*Ophiogomphus severus*, *Calopteryx aequabilis*, *Baetis* mayflies, etc.) that are not found in Little Warm Creek, but both sites share most of their other taxa (~20 shared species). The Intermittent Prairie Pool Sites and Perennial Prairie Pond sites share the majority of taxa except longer-lived taxa (*Stagnicola* snails, *Anax* and *Aeschna* dragonflies) that cannot survive extended dry periods.

Average macroinvertebrate taxa richness per site was 25 and the highest taxa richness reported at the Little Warm bridge site with 36 taxa (Appendix A). Using the Montana DEQ macroinvertebrate multimetric index (MMI), Little Warm and Big Warm Creek bridge sites were ranked non-impaired (good to excellent biological integrity), the Little Warm cattail site #2 was slightly impaired. Two sites that would rank impaired (data is not complete yet) with the MMI are TNC Corner Springs and Buffalo Jump Springs because they contain anoxic sediments and contain no macroinvertebrates except tolerant Chironomidae and Oligochaeta. The Lone Tree Coulee Intermittent Pool may score fair to good with the O/E as an Intermittent Prairie Pool, but not with the MMI. The best quality site in terms of expected macroinvertebrate community is the Big Warm Creek site because of that sites ability to contain species that exist on clean gravels and cobbles with perennial flows. Little Warm Creek contains some flow but is dominated by the more tolerant species of that assemblage and does not contain the more intolerant riverine species.

### ***Fish Communities.***

Overall, 6 native fish species were collected on the Matador stream sites (pond sites were not sampled for fish, and the springs were fishless) (Table 3). Little Warm Creek site #1 picked up an additional species in 2007 compared to 2005. I collected 5 spp. in Big Warm Creek in 2005, but 6 species were collected this past visit in 2007 (Table 3). Brook stickleback and Northern Redbelly dace were collected at all 3 sites both years, while fathead minnows and white suckers occurred at 83% of the site visits (Table 3). Longnose dace and mottled sculpin were only collected at the Big Warm Creek site (Table 3); this is largely because of the presence of clean gravels (these species are benthic invertivores and lithophilous spawners).

**Table 3.** Fish species collected at the Matador stream study sites in 2005 & 2007. F of O = Frequency of Occurrence of that species across all sites. O/E= Observed/Expected Fish Species.

	Little Warm #1 2005	Little Warm #1 2007	Little Warm #2 2005	Little Warm #2 2007	Big Warm #2 2005	Big Warm #2 2007	Beaver Creek Pools 2007	F of O
Brook Stickleback	7	12	100	2	5	22	0	1.00
Fathead Minnow	0	3	75	18	1	1	0	0.83
Longnose Dace	0	0	0	0	9	65	0	0.33
Mottled Sculpin	0	0	0	0	0	3	0	0.17
Northern Redbelly Dace	15	33	100's	45	5	14	0	1.00
White Sucker	1	2	0	2	6	8	0	0.83
Total Individuals	23	50	~500	65	26	113	0	
Total # species	3	4	3	4	5	6	0	
Native Species	3	4	3	4	5	6	0	
O/E	0.75	1.0	0.75	1.0	1.0	1.0	0	

Using the O/E scoring system, 3 of the 4 fish sites ranked non-impaired for both years (>0.75=good to excellent biological integrity), and 1 site ranked impaired (the Beaver Creek pools) (Table 3) because at least 1 fish species could have been expected for this stream type, but was not collected. The Mottled Sculpin (*Cottus bairdi*) population in Big Warm Creek is a unique find this far into eastern MT, and is an indicator of the cooler spring-fed nature of this stream; sculpin are typically cool-water system inhabitants.

***Dragonflies and Damselflies.*** Five dragonfly species were common across most lotic/lentic sites (Common Green Darner, *Anax junius*; Variable Darner, *Aeshna interrupta*, the 12-spotted skimmer, *Libellula pulchella*; Eight-spotted Skimmer *Libellula forensis* (Photo left) and the Variagated Meadowhawk, *Sympetrum corruptum*.



No species of concern (SOC) were noted at any sites.

The pale snaketail dragonfly, *Ophiogomphus severus*, and the river jewelwing damselfly, *Calopteryx aequabilis* (a Potential SOC, Photo right above) were only recorded at the Big Warm Creek site. The damselflies (Familiar Bluet, *Enallagma civile*, Northern Bluet, *Enallagma cyathigerum*; Eastern Forktail, *Ischnura verticalis* and the Common Spreadwing, *Lestes disjunctus*) were common at most stream pools or lentic sites.

#### ***Amphibian and Reptile Incidentals***

Five amphibian species (Woodhouse's Toad, *Bufo woodhousei*; Great Plains Toad, *Bufo cognatus*; Plains Spadefoot, *Spea bombifrons*; Tiger salamander, *Ambystoma tigrinum* and the Northern Leopard Frog, *Rana pipiens*) and 2 reptile species (Painted Turtles, *Chrysemys picta* & the Plains Garter Snake, *Thamnophis radix*) were recorded during all surveys.



## Site Descriptions: Northern Glaciated Perennial Prairie Stream (AES C006)

### Management/Threats to this ecological system include:

Grazing and livestock use around the riparian areas that is occurring or has occurred in the past can have strong local effects resulting in sedimentation and stream widening at cattle crossings. Introductions of game or forage fish in stock ponds anywhere in the watershed can make their way downstream to these perennial prairie rivers and become permanent residents, competing with (green sunfish) or preying upon (northern pike) resident native fish species. These prairie river ecological types are abundant in terms of river miles across the Northern Great Plains Steppe of North America, but the hydrology (i.e. water permanence) can be easily affected by upstream dams or diversions in the watershed. Stock ponds that are stocked with game fish, and bait bucket introductions can also contribute to the community degradation brought about by the introduced fish species.

### Little Warm Creek (Bridge Site #1)

**Location:** Accessed from Bridge Crossing first run/pool set designated the top of the reach.

**Ecoregion:** Northern Glaciated Plains (Typical)

**Aquatic Ecological System Type:** C006-Northern Glaciated Perennial Prairie Stream

**Key Environmental Factors:** Hydrology--upstream dams or diversions in the watershed; depositional silted areas forming cattail (*Typha latifolia*) mats, Grazing--slight impacts.

**Rare or Unique Species:** No rare species, but native fish community

**Rare Features:** Good Prairie Stream Habitat

**Introduced/Exotic Aquatic Species:** None

**Overall Ecological Site Condition:** Fair trending to Good

**This stream reach has a fair diversity of microhabitats including undercut banks and aquatic vegetation leading to a fair fish community (4 native species). Pools averaged 30m long and 2.9 m wide. The pool complexes proceeding upstream were deep enough to allow seining for fish. All substrate of the pools was dominated by silt/organic materials with some pebbles and gravels.**



**Macroinvertebrate Community:** This community of prairie stream invertebrates consists of the Prairie Pool assemblage (#12, Stagliano 2005). The community indicator species are characterized by tolerant, damselfly taxa, *Coenagrion* /*Enallagma* sp., *Lestes* and *Ishnura*, the crustaceans (*Hyalella* and *Gammarus*), many genera of the water boatman (Corixidae: *Sigara alternata*, *Trichocorixa nais*, and *Corisella*), the snails (*Physella*, *Gyraulus*, and *Stagnicola*), mayflies (*Caenis* and *Callibaetis*), and beetles (*Oreodytes*, *Laccophilus*, *Hydroporus* and *Hygrotus*).

Only 70% of the indicator species were present in this sample, but the DEQ MMI is showing good to excellent biointegrity.

**Macroinvertebrate Community Quality:**

**MTDEQ MMI= 47.1 O/E= 70%**

## **Little Warm Creek (Cattail Pools site #2)**

**Location:** Accessed from left turn on county road upstream ~500m from the Bridge Crossing.

**Ecoregion:** Northern Glaciated Plains (Typical)

**Aquatic Ecological System Type:** C006-Northern Glaciated Perennial Prairie Stream

**Key Environmental Factors:** Hydrology--upstream dams or diversions in the watershed; depositional silted areas forming large cattail mats (*Typha latifolia*), Grazing—no noticeable impacts.

**Rare or Unique Species:** No rare species, but native fish community

**Rare Features:** **Good Riparian Prairie Stream Habitat with a** dense snowberry and willow zone within this reach.

**Introduced/Exotic Aquatic Species:** None

**Overall Ecological Site Condition:** Fair

**Macroinvertebrate Community:** This community of prairie stream invertebrates consists of the Prairie Pool assemblage (#12, Stagliano 2005). The community indicator species are characterized by tolerant, damselfly taxa, *Coenagrion* /*Enallagma* sp., *Lestes* and *Ishnura*, the crustaceans (*Hyaella* and *Gammarus*), many genera of the water boatman (Corixidae: *Sigara alternata*, *Trichocorixa nais*, and *Corisella*), the snails (*Physella*, *Gyraulus*, and *Stagnicola*), mayflies (*Caenis* and *Callibaetis*), and beetles (*Oreodytes*, *Laccophilus*, *Hydroporus* and *Hygrotus*).

Only 60% of the indicator species were present in this sample, and the DEQ MMI is indicating a slightly impaired biological integrity.

**Macroinvertebrate Community Quality:**

**MTDEQ MMI= 35.2      O/E= 60%**





## **Big Warm Creek (Bridge Site #1)**

**Location:** Accessed from 2-track past the Ranch House to the Hay Meadows.

**Ecoregion:** Northern Glaciated Plains (Typical 42).

**Aquatic Ecological System Type:** C006-Northern Glaciated Perennial Prairie Stream

**Key Environmental Factors:** Hydrology--upstream dams or diversions in the watershed; depositional silted areas forming large *Scirpus* mats (Big Stem Bulrush), Grazing—no noticeable impacts.

**Rare or Unique Species:** No SOC species, but native fish community + the freshwater mussel (*Pyganodon grandis*) and the PSOC river jewelwing damselfly (*Calopteryx aequabilis*).

**Rare Features:** none.

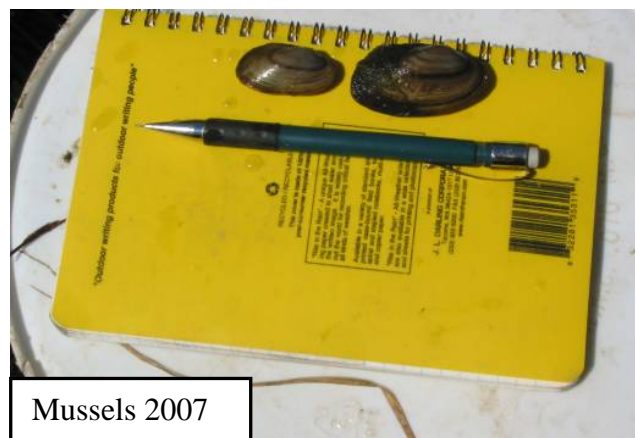
**Introduced/Exotic Aquatic Species:** None

**Overall Ecological Site Condition:** Fair trending to Good

This stream reach has a fair diversity of microhabitats including undercut banks, gravel runs, cobbles and aquatic vegetation, leading to a good fish community (6 native species). The reach is dominated by a long run with some side-depositional pools, it averaged 2.1 m wide with channel depths of ~30cm.

**Macroinvertebrate Community Quality:** MTDEQ MMI= 54.5 O/E= 80%

The freshwater mussel, giant floater (*Pyganodon grandis*) population is doing very well (~75 individuals in the 50m reach surveyed) most of these are 3-5 year olds (40-50mm, right in photo), but there is evidence of recent recruitment, 1-2 yrs (20-30mm, left in photo). They are located in the gravel/silt interface where streamflow keeps the substrate clean. Host fish=brook stickleback



Mussels 2007



Mussels 2005





## **Matador Perennial Pond**

*Scirpus* (Big Stem Bulrush) emergent vegetation dominated, with Spikerush (*Elocharis sp.*) present and abundant. Fully aquatic plants included *Meriophyllum sp.* and *Potamogeton sp.*

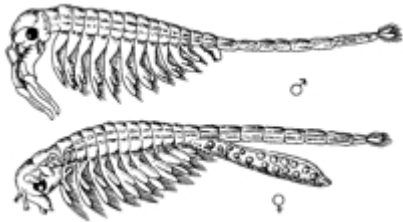
**Macroinvertebrate Community:** This community of prairie stream invertebrates consists of the Prairie Pool assemblage (SPA #12, Stagliano 2005). The 2007 sample was dominated by the snails (*Physella*-100's), (*Gyraulus*, *Helisoma anceps* and *Stagnicola* -a few), the damselfly taxa, *Coenagrion* /*Enallagma sp.*, *Lestes spp.* & *Ishnura*, the crustaceans (*Hyaella* and *Gammarus*), many genera of the water boatman (Corixidae), the backswimmers, *Notonecta*, the mayfly (*Callibaetis*), and water-beetles (*Oreodytes*, *Laccophilus*, *Hydroporus* and *Hygrotus*).

**Painted turtles and woodhouse's toad (*Bufo woodhousei*) tadpoles were abundant .**



## **Fairy Shrimp Pools near Matador Perennial Pond:**

This roadside ditch pool was sampled on the way to the perennial pond across the road when I noticed movement within the recently (~2 weeks) filled old stream channel. Upon investigation and a few dipnet sweeps, the common fairy shrimp: *Branchinecta paludosa* (see picture) was found to be highly



abundant (hundreds per sq. meter) in these isolated pools. Co-occurring with the fairy shrimp were Ostracoda crustaceans, backswimmer waterbugs: *Notonecta*, and the pioneering Hydrophilidae beetles: *Hydrobious* and *Berosus*. These insects were recent colonizers, while the crustaceans were hatched from drought-resistant diapausing eggs that were lying dormant in the substrate.





### **Buffalo Jump Spring:**

The initial outflow is coming out of a 2x4 meter seepage area at a temperature of 13°C / 56 °F, the sediments are anoxic (0mg/l of oxygen at the sediment surface), thus most of the invertebrates are clinging to the vegetation, only Oligochaeta worms were found in the sediments. Emergent wetland vegetation is dominated by a Spikerush (*Eleocharis sp.*)



### **TNC Corner Section Springs**

The initial outflow is coming out of 2-8x8 meter seepage areas, densely surrounded by *Scirpus sp* (Big Stem Bulrush)(Left photo) and cattails (*Typha latifolia*)(right photo) at a temperature of 14°C / 58 °F, the sediments are silted and anoxic (0mg/l of oxygen at the sediment surface), thus most of the invertebrates are clinging to the vegetation, only Oligochaeta worms were found in the sediments. A side channel has water temperatures of 28°C / 80°F indicating a surface flow origin. Plains spadefoot toad tadpoles collected in the pools below springs.



### **Lone Tree Pool on the Coulee (Spring?)**

The outflow was not located but was assumed to be feeding this perennial pool from sub-surface. This pool (~40m long x 4m wide) is densely surrounded by *Scirpus* sp (Big Stem Bulrush) and remnants of dying cattails (*Typha latifolia*). The surface temperature of the pool was 23°C / 73°F, the sediments are silt and anoxic organic materials (0mg/l of oxygen at the sediment surface), thus most of the invertebrates are clinging to the vegetation; only *Oligochaeta* worms and midges (chironomidae) were found in the sediments.

**Macroinvertebrate Community:** This community of prairie stream invertebrates consists of the Prairie Pool assemblage (#12, Stagliano 2005). The community indicator species are characterized by tolerant, damselfly taxa, *Coenagrion* / *Enallagma* sp., *Lestes* and *Ishnura*, the crustaceans (*Hyaella* and *Gammarus*), many genera of the water boatman (Corixidae: *Sigara alternata*, *Trichocorixa nais*, and *Corisella*), the snails (*Physella*, *Gyraulus*, and *Stagnicola*), the mayfly, *Callibaetis*, and beetles (*Oreodytes*, *Laccophilus*, *Hydroporus* and *Hygrotus*).



### **Beaver Creek Pools #1 (see cover photo).**

These intermittent pools were 23.5°C / 74°F and have been recently inundated by thunderstorms and surface run-off flow, therefore the macroinvertebrates existing there are recent fly-in colonizers, and included the pioneering Hydrophilidae water beetles: *Hydrobious* and *Berosus* and backswimmer waterbugs: Notonecta, and waterboatmen, Corixidae.



# Appendix A:

## Montana Bioassessment Report

Waterbody Name: Little Warm Creek #1

Benthic Sample ID: 14933

Station ID: MOTNCSQ101

Rep. Num: 0

Reference

STORET Activity ID:

TNC1Q5-M

Site Classification:

Collection Date:

07/30/2005

Latitude:

Collection

MTkick500

Longitude:

Total Number of Individuals in Sample:

### Sample Taxa List

<i>Order:</i>	<i>OTU name:</i>	<i>FinalID:</i>	<i>Individuals</i>	<i>Tol Val:</i>	<i>FFG:</i>	<i>Habit:</i>
Hirudina		Glossiphona complanata	2			
Amphipoda	Gammarus	Gammarus	2	4	CG	"SW/50%, SP/50%"
Amphipoda	Hyalella	Hyalella	69	8	CG	SW/SP
Basommatop	Physa_Physella	Physella	13	8	CG	CN
BASOMMAT	Planorbidae	HELISOMA ANCEPS	12	7	SC	
Basommatop	Planorbidae	Planorbella	8		SC	CN
COLEOPTA		DINEUTUS	3	4	PR	
Coleoptera	Dubiraphia	Dubiraphia	2	6	SC/CG	"CN/50%, BU/50%"
Coleoptera	Tropisternus	Tropisternus	2		PR	"CN,SP,CM(la),
Diptera	Chironominae	Cryptochironomus	2	8	PR	BU/SP
Diptera	Chironominae	Dicrotendipes	1	8	CG	BU
Diptera	Chironominae	Paratanytarsus	18	6	CG	SP
Diptera	Chironominae	Polypedilum	2	6	SH	CN
Diptera	Chironominae	Pseudochironomus	3	5	CG	BU
Diptera	Chironominae	Tanytarsus	21	6	CF	CN
Diptera	Dixella	Dixella	2		CG	SW
Diptera	Orthoclaadiinae	Heterotrissocladius	2	0	CG/SC	SP/BU
Diptera	Orthoclaadiinae	Psectrocladius	1	8	CG	BU
Diptera	Tanypodinae	Procladius	4	9	PR	SP
Diptera	Tanypodinae	Thienemannimyia Gr.	3	5	PR	SP
Ephemeropte		Caenis amica	1	7	CG	"SP/75%, CM/90%"
Ephemeropte	Caenis	Caenis latipennis	5	7	CG	"SP/75%, CM/90%"
Hemiptera	Corixidae	Corixidae	4	9	PH/PR	SW
Odonata		Aeshna eremita	2	7	PR	unk
Odonata	Anax	Anax junius	2	6	PR	unk
Odonata	Coenagrionidae	Coenagrion/Enallagma	9	7	PR	unk
Odonata	Libellulidae	Sympetrum	1	9	PR	unk
Veneroida	Pisidiidae	Pisidium	15	8	CF	BU
Veneroida	Pisidiidae	Sphaerium	2	8	CF	BU

	<i>Metric:</i>	<i>Value</i>	<i>Score</i>
<b>Plains MMI</b> <b>47.3</b>	<b>EPT Taxa:</b>	<b>1.0</b>	<b>7.1</b>
	<b>Tanypodinae Percent:</b>	<b>3.3</b>	<b>32.9</b>
	<b>Orthoclaadiinae/Midges:</b>	<b>5.3</b>	<b>94.7</b>
	<b>Predator Taxa:</b>	<b>7.0</b>	<b>77.8</b>
	<b>Collector + Filterer Pct:</b>	<b>84.5</b>	<b>23.8</b>

## Appendix A: cont.

### Montana Bioassessment Report

Waterbody Name: Little Warm Creek #2

Benthic Sample ID: 14934

Station ID: MOTNCSQ102

Rep. Num: 0

Reference

STORET Activity ID: TNC1Q5-M

Site Classification:

Collection Date: 07/30/2005

Latitude:

Collection MTKick500

Longitude:

Total Number of Individuals in Sample:

#### Sample Taxa List

<i>Order:</i>	<i>OTU name:</i>	<i>FinalID:</i>	<i>Individuals</i>	<i>Tol Val:</i>	<i>FFG:</i>	<i>Habit:</i>
Hirudina		Glossiphona complanata	5			
Amphipoda	Gammarus	Gammarus	2	4	CG	"SW/50%, SP/50%"
Amphipoda	Hyaella	Hyaella	99	8	CG	SW/SP
Basommatop	Physa_Physella	Physella	43	8	CG	CN
BASOMMAT	Planorbidae	HELISOMA ANCEPS	12	7	SC	
Coleoptera	Haliphus	Haliphus	5	7	SC/CG	"CN/50%, BU/50%"
Coleoptera	Dubiraphia	Dubiraphia	12	6	SC/CG	"CN/50%, BU/50%"
Coleoptera	Tropisternus	Tropisternus	2		PR	"CN,SP,CM(la),
Diptera	Chironominae	Chironomus	10	8	PR	BU/SP
Diptera	Chironominae	Dicrotendipes	1	8	CG	BU
Diptera	Chironominae	Paratanytarsus	18	6	CG	SP
Diptera	Chironominae	Polypedilum	2	6	SH	CN
Diptera	Chironominae	Pseudochironomus	3	5	CG	BU
Diptera	Chironominae	Tanytarsus	31	6	CF	CN
Diptera	Tanypodinae	Procladius	8	9	PR	SP
Diptera	Tanypodinae	Thienemannimyia Gr.	3	5	PR	SP
Ephemeropte	Caenis	Caenis latipennis	14	7	CG	"SP/75%, CM/90%"
Hemiptera	Corixidae	Corixidae	23	9	PH/PR	SW
Odonata		Aeshna eremita	2	7	PR	unk
Odonata	Anax	Anax junius	2	6	PR	unk
Odonata	Coenagrionidae	Coenagrion/Enallagma	9	7	PR	unk
Odonata	Libellulidae	Sympetrum	1	9	PR	unk

	<i>Metric:</i>	<i>Value</i>	<i>Score</i>
<b>Plains MMI</b> <b>35.2</b>	<b>EPT Taxa:</b>	<b>1.0</b>	<b>7.1</b>
	<b>Tanypodinae Percent:</b>	<b>6.5</b>	<b>22.9</b>
	<b>Orthocladiinae/Midges:</b>	<b>0</b>	<b>94.7</b>
	<b>Predator Taxa:</b>	<b>9.0</b>	<b>77.8</b>
	<b>Collector + Filterer Pct:</b>	<b>80.5</b>	<b>15.8</b>

# Montana Bioassessment Report

Waterbody Name: Big Warm Creek

Benthic Sample ID: 14935

Station ID: MOTNCSQ103

Rep. Num: 0

Reference

STORET Activity ID: TNC1Q5-M

Site Classification:

Collection Date: 07/30/2005

Latitude:

Collection MTKick500

Longitude:

Total Number of Individuals in Sample:

## Sample Taxa List

<i>Order:</i>	<i>OTU name:</i>	<i>FinalID:</i>	<i>Individuals</i>	<i>Tol Val:</i>	<i>FFG:</i>	<i>Habit:</i>
Amphipoda	Hyalella	Hyalella	22	8	CG	SW/SP
Basommatop	Physa_Physella	Physella	24	8	CG	CN
Basommatop	Planorbidae	Planorbella	8		SC	CN
Coleoptera	Dubiraphia	Dubiraphia	2	6	SC/CG	"CN/50%, BU/50%"
Coleoptera	Optioservus	Optioservus	18	6	SC/CG	"CN/50%, BU/50%"
Diptera	Chironominae	Dicrotendipes	1	8	CG	BU
Diptera	Chironominae	Polypedilum	21	6	SH	CN
Diptera	Chironominae	Pseudochironomus	3	5	CG	BU
Diptera	Chironominae	Tanytarsus	21	6	CF	CN
Diptera	Dixella	Dixella	2		CG	SW
Diptera	Orthoclaadiinae	Heterotrissocladius	2	0	CG/SC	SP/BU
Diptera	Orthoclaadiinae	Cricotopus	5	8	CG	BU
Diptera	Tanypodinae	Thienemannimyia Gr.	8	5	PR	SP
Ephemeropte	Caenis	Caenis latipennis	5	7	CG	"SP/75%, CM/90%"
Ephemeropte	Baetis	Baetis tricaudatus	22	4	CG	"SP/75%, CM/90%"
Hemiptera	Corixidae	Corixidae	9	9	PH/PR	SW
Odonata		Aeshna eremita	4	7	PR	unk
Odonata		Ophiogomphus severus	6	4	PR	unk
Odonata		Calopteryx aequiabus	2	6	PR	unk
Odonata	Coenagrionidae	Coenagrion/Enallagma	22	7	PR	unk
Odonata	Libellulidae	Sympetrum	2	9	PR	unk
Veneroida	Pisidiidae	Pisidium	15	8	CF	BU
Veneroida	Pisidiidae	Sphaerium	12	8	CF	BU

	<i>Metric:</i>	<i>Value</i>	<i>Score</i>
<b>Plains MMI</b> <b>54.5</b>	<b>EPT Taxa:</b>	<b>2.0</b>	<b>15.1</b>
	<b>Tanypodinae Percent:</b>	<b>4.3</b>	<b>29.9</b>
	<b>Orthoclaadiinae/Midges:</b>	<b>5.3</b>	<b>94.7</b>
	<b>Predator Taxa:</b>	<b>7.0</b>	<b>77.8</b>
	<b>Collector + Filterer Pct:</b>	<b>64.5</b>	<b>33.8</b>